



STANDARD SPECIFICATION

DWS 2510 SUPPLY OF VALVES

Department of Water Affairs and Forestry
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INDEX

GENERAL TECHNICAL SPECIFICATION

AUXILIARY DRIVES

PARTICULAR VALVE SPECIFICATION – AIR RELEASE AND VACUUM CONTROL VALVES

PARTICULAR VALVE SPECIFICATION – BUTTERFLY VALVES

PARTICULAR VALVE SPECIFICATION – FLOAT/LEVEL CONTROL VALVES

PARTICULAR VALVE SPECIFICATION – GATE VALVES

PARTICULAR VALVE SPECIFICATION – GLOBE VALVES

PARTICULAR VALVE SPECIFICATION – NON-RETURN VALVES

PARTICULAR VALVE SPECIFICATION – PRESSURE REDUCING AND SUSTAINING VALVES

PARTICULAR VALVE SPECIFICATION – RING NEEDLE VALVES

PARTICULAR VALVE SPECIFICATION – SAFETY RELIEF VALVES

PARTICULAR VALVE SPECIFICATION – SLEEVE VALVES

PARTICULAR VALVE SPECIFICATION – SPHERICAL VALVES

ANNEXURE VS1 – STANDARD DRAWINGS

ANNEXURE VS2 – PROJECT SPECIFIC FORMS



STANDARD SPECIFICATION

DWS 2510 SUPPLY OF VALVES

GENERAL TECHNICAL SPECIFICATION



INDEX

	PAGE
1 SCOPE.....	2
2 STANDARDS AND DEFINITIONS.....	2
2.1 REFERENCES.....	2
2.2 SUPPORTING SPECIFICATION	2
2.3 DEFINITIONS	2
2.4 PRECEDENCE	3
2.5 DEVIATIONS.....	3
3 GENERAL CONDITIONS AND REQUIREMENTS.....	3
3.1 NOMINAL PRESSURE	3
3.2 MINIMUM PRESSURE RATING.....	3
3.3 DESIGN LIFE	4
3.4 GUARANTEE	4
3.5 FLANGES.....	4
3.6 JOINTING MATERIAL	4
3.7 CONTACT BETWEEN DISSIMILAR METALS.....	5
3.8 CORROSION PROTECTION	5
3.9 VALVE SUPPORTS AND LIFTING	5
3.10 BYPASSING.....	5
3.11 PRESSURE GAUGES	6
3.12 MATERIALS.....	6
3.13 CONSTRUCTION	6
3.14 MARKING.....	8
3.15 POSITION INDICATORS	9
3.16 PIPES AND SPECIALS	9
3.17 ACTUATORS	10
3.18 INSPECTION AND QUALITY CONTROL.....	10
3.19 PRESSURE TEST REQUIREMENTS	10
3.20 FUNCTIONAL TEST REQUIREMENT.....	12
3.21 EQUIPMENT DRAWINGS.....	12
3.22 OPERATING AND MAINTENANCE MANUALS.....	13
3.23 HANDLING AND TRANSPORT	14
3.24 MATERIAL SYMBOLS	15



1 SCOPE

This section covers the basic specifications for the design, manufacture and supply of valves for the transportation and control of raw water. Valves shall be manufactured in accordance with the appropriate valve codes and standards

2 STANDARDS AND DEFINITIONS

2.1 REFERENCES

When reference is made to a code, specification or standard, the reference shall be taken to mean the latest edition of the code, specification or standard; including addenda, supplements and revisions thereto.

2.2 SUPPORTING SPECIFICATION

Where this specification is required for a project, the following specifications shall, inter alia, form part of the contract.

- a) SABS Standards
- b) BS Standards
- c) ISO Standards
- d) DIN Standards
- e) API Standards
- f) ANSI Standards.

2.3 DEFINITIONS

For the purpose of this specification the following definitions apply.

2.3.1 Face to face dimensions.

The distance between the two planes perpendicular to the body axis located at the extremities of the body and ports.

2.3.2 Nominal pressure (PN).

All pressure units throughout the valve specification will be recorded in kilopascals (kPa).

Nominal pressure (PN) is a numerical designation, which is a convenient round number for reference purposes.

Note 1 : The maximum allowable working pressure depends upon the materials, design and working temperature and shall be selected from the pressure/temperature rating tables in the appropriate standards.

Note 2 : It is designated by PN followed by the allowable working pressure.

Note 3 : This definition is in accordance with ISO 7268.



2.3.3 Nominal size (DN).

A numerical designation of size that is common to all components in a piping system other than components designated by outside diameters. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions in millimetres.

Note 1 : Nominal size is designated by DN followed by the size in millimetre.

Note 2 : This definition is in accordance with ISO 6708.

All equipment of the same size (DN) designated by the same PN number shall have compatible mating dimensions.

2.3.4 Tight shut off valve.

A valve that has no leakage past the sealing faces in it's closed position under test conditions.

2.3.5 Low leakage rated valve.

A valve that has an agreed leakage rate past the sealing faces when the valve is in the closed position.

2.3.6 Regulating valve.

A valve intended for regulating purposes, and which may have a clearance between the sealing faces when the valve is in the closed position.

2.4 PRECEDENCE

Any conflict between the technical requirements stated in the Project Specification and the technical requirements of this specification shall be referred to the Department for clarification.

2.5 DEVIATIONS

The Department will not permit any substitution or deviation from the requirements of this specification without prior approval. Any substitution or deviation from the original specification must be submitted to the Department for approval only during the tender stage of the project.

3 GENERAL CONDITIONS AND REQUIREMENTS

3.1 NOMINAL PRESSURE

Each valve is assigned a nominal pressure (PN) in kPa and shall be tested in accordance with these specified pressures.

3.2 MINIMUM PRESSURE RATING

1 000 kPa is considered to be the lowest acceptable pressure rating for any valve irrespective of lower system pressures.



3.3 DESIGN LIFE

All valves and appurtenant fittings shall be designed for a useful life of forty-five (45) years under the operating conditions specified in the Project Specification.

3.4 GUARANTEE

All valves shall be guaranteed against faulty design, materials and workmanship for a period of five (5) years from date of delivery. During this period the Contractor shall attend to and rectify at his own cost any defects that can be attributed to faulty design, materials and workmanship. Normal wear and tear shall be excluded.

3.5 FLANGES

Unless specified under the Project Specification, all valves shall be double flanged and drilled off centre to SABS 1123. Flange thickness shall be in accordance with BS 4504 for cast iron valves and SABS 1123 for fabricated valves.

Should a required flange size fall beyond the range of SABS 1123, mating dimensions shall be in accordance with ISO Standard 7005 with thickness adequate to withstand closed end pressures.

Flanges with a pressure rating between 1000 - 1600 kPa shall have flat joint faces machined in accordance with the above SABS or BS specifications. Flange pressure ratings that exceed 1600 kPa shall incorporate an "O" ring sealing arrangement. Details of the proposed "O" ring groove shall be furnished at the tendering stage for consideration.

Flange sizes exceeding and including DN 1500 or shall however incorporate an "O" ring sealing arrangement irrespective of pressure rating.

For details on the corrosion protection of the "O" ring arrangement see Standard Specification DWS 9900 Section C3 .

The periphery of all flanges shall be machined to the correct outside diameter dictated by the flange pressure rating. Flanges for pipes and fabricated valves shall be machined on both faces.

All holes, shall be drilled perpendicular to the face and spot machined on the bolt head/nut bearing faces.

Sufficient clearance shall be allowed between the body and flange to enable flange bolts to be removed or tightened. Tapped holes shall only be permissible where stiffening ribs or shaft bosses interfere with bolts.

One flange of the valve body shall be clearly marked, identifying the respective pressure rating. (Refer to Paragraph 3.14)

3.6 JOINTING MATERIAL AND FASTENERS

Valves shall be supplied complete with bolt units, consisting of a standard length bolt, nut and two washers. The stud unit, where applicable, shall be supplied with a standard length stud, nut and washer. A washer shall be fitted under all bolt/screw heads and nuts



The shortest standard bolt or stud that protrudes beyond the nut by a minimum of two threads when the assemblies are fully tightened shall be used. The same applies to stud units.

The manufacturer shall specify a fastening sequence for bolts (if applicable) and the torque settings (in Nm) for all bolts. These torque settings and fastening sequences shall be included in the Operation and Maintenance Manual.

In addition each valve shall be supplied with full-face gaskets or "O" rings for joining up to adjacent flanges.

Depending on the valve location in a piping system and the atmospheric conditions, the following specifications will apply:

- a) Black bolted units to SABS 135
- b) Precision bolted units to SABS 136
- c) Galvanised bolted units to SABS 763
- d) Stainless steel bolted units to DIN 931
- e) Stainless steel set screws to DIN 933

For all valve components, i.e. bonnet covers, glands etc., drilled holes for bolts shall be perpendicular to the flange face.

All bolts and stud units shall be the same length and appropriate size and corrosion protected as per Standard Specification DWS 9900 Section C3 Specification.

When required by the Project Specification, isolating bolt units shall be supplied with bolt, nut, two washers, an isolating sleeve and two isolating washers.

3.7 CONTACT BETWEEN DISSIMILAR METALS

Refer to Standard Specification DWS 9900 Section C3 .

3.8 CORROSION PROTECTION

Corrosion protection shall be as specified in Standard Specification DWS 9900 Section C3

3.9 VALVE SUPPORTS AND LIFTING

Valves of DN 400 and larger shall have supporting feet cast integrally with the valve body.

Each valve over DN 300 or 100 kg mass, shall have two eye bolts of the required strength securely attached to the valve body to facilitate easy handling during transport and installation.

3.10 BYPASSING

Where specified in a Project Specification, valves shall be fitted with bypasses and bypass valves. Piping shall be flanged.

Bypasses shall be bolted to the valve body and not to the adjoining pipe work. Piping and fittings shall be hot dipped galvanised after fabrication.



3.11 PRESSURE GAUGES

Where specified in the Project Specification, valves shall be fitted with glycerine filled pressure gauges complete with separate stainless steel isolating ball cocks. The pressure gauges shall in general conform to SABS 1063.

The gauge face shall have a minimum diameter of 100mm with black lettering and needle on a white background. A red line or needle shall indicate the maximum safe working pressure, where applicable. Pressure gauges shall be calibrated in increments of 5 % of the full scale reading. The normal working pressure shall give a reading of between 50 and 75 % of the full scale.

3.12 MATERIALS

Unless otherwise specified in the Particular Valve Specification, valve bodies and components shall be of the materials listed below:

Mild steel	:	BS 4360 Gr 43, SABS 1431 : Gr 300WA
SG iron	:	BS 2789 Gr 420/12, SABS 936 SG 42
Cast iron	:	SABS 1034 Gr 250
Cast steel	:	BS 1504-161 Gr 480, SABS 1465 Part 1
Stainless steel components	:	BS 970 Part 4 Gr 304, 316 or 431

All material shall be new and of first grade quality. Material certificates for all materials are required.

Where copper alloys are used they shall have a zinc content of less than 0,5% and be suitably insulated against galvanic currents.

Cast material shall only be cast in moulds coated with a mould wash.

Cast components shall not be warped or distorted in any way.

No repair of cast components will be permitted unless approved by the Engineer.

The structure of cast components shall be homogeneous and free from non-metallic impurities or visible chaplets.

Items to be galvanised shall be fabricated from aluminium-killed steel or silicon-killed steel with <0,04% Silicon and $0,009 < \text{Phosphor} < 0,025\%$.

3.13 CONSTRUCTION

3.13.1 Bodies

Bodies shall be of sturdy construction, capable of functioning satisfactorily under abnormal operating conditions without distortion of the body or malfunction of component parts and shall be shaped to give minimum change in waterway.

Designs of bodies and components shall be free from pockets that cause eddies or accumulate debris.



Where applicable, access openings and covers shall be well designed and the creation of stress risers shall be prevented. Any gussets applicable to the design of the valve should form an integral part of the casting.

3.13.2 Doors and discs

Doors and discs shall where applicable be cast or fabricated as a unit with integrally cast hinge lugs.

Doors and discs shall operate freely. Their travel shall however be restricted by the provision of substantial stops, fitted with specified facings to minimise wear and damage to the corrosion protection.

3.13.3 Sealing faces

Sealing faces shall be deposit welded with stainless steel unless otherwise specified in the Project Specification. Where approved in writing by the Engineer the sealing faces may be securely fixed with corrosion resistant elements.

Faces shall be accurately machined and finished to meet the requirements of the specification.

3.13.4 Bearings

Main bearings shall, where applicable, be external and accessible without emptying or removal of the valve body from the line.

Bearings shall be designed to take any unbalanced thrusts on doors or discs.

Bearings shall retain a low co-efficient of friction. Any possibility of bearings becoming tight during service due to ageing shall be eliminated.

Where possible, bearings shall be water lubricated with a proven record of dependable operation of not less than five (5) years.

Details of the type and construction of bearings will be as specified in the Particular Valve Specification (if applicable).

Where shafts protrude through the valve at the non-drive end (NDE) they shall be sealed with bolted stainless steel, grade 316, bearing cover plates. Screwed taper plug covers are not acceptable.

Sleeve type bearings shall be fully corrosion resistant and shall be fitted in the hubs in the valve body. Steel back bearings shall not be accepted.

3.13.5 Bearing and shaft seals

Bearing and shaft seals shall be of the "O" ring or radial cup type with machined weep holes or grooves for drainage at the gearbox mounting flange.

3.13.6 Handwheels:

All valves shall be supplied complete with handwheels, which shall have the wording, "OPEN" and "CLOSE" together with directional arrows legibly cast in recesses on the upper surface of the rim.

Closure of valves shall be through the clock-wise rotation of hand wheels. All valves shall be capable of being opened or closed under an unbalanced pressure equal to the Nominal



Pressure. The effort required on hand wheels to open or close valves under these conditions shall not exceed 90 N.

Handwheels shall be manufactured to ensure a close fit between the hand wheel and the mating spindle head and shall be firmly fixed to the spindle head. Loose-fitting hand wheels are not acceptable.

3.13.7 Lubricating points:

All lubricating points for grease gun lubrication shall be fitted with 1/8" BSP stainless steel button head type grease nipples. Nipples shall be painted red for easy identification. Electro-plated nipples will under no circumstances be accepted.

3.14 MARKING

3.14.1 General

Each valve shall be clearly marked in accordance with the requirements of BS 5418.

3.14.2 Body Marking

All valve bodies shall be permanently and indelibly marked (cast in 15 mm minimum lettering size on castings or welded on fabricated valves) as follows:

- a) Nominal size (DN),
- b) Nominal pressure (PN in kPa),
- c) Arrow to indicate the direction of flow,
- d) The contract number plus identification number to identify each individual valve.

The above markings shall be legible after painting.

In order to facilitate identification at the factory and at site, all valve bonnets, gates, discs, doors, etc. shall be permanently marked (cast in or welded on in 15mm minimum lettering) with the contract number and an identification number for each individual valve.

In addition to the above, one flange for a flanged valve shall be clearly marked with a single set of machined notches (at least 3mm wide, 3mm deep and the length of the notch to suit the width of the flange). For wafer type valves, the width and depth of the notch shall be identical to that of the flanged valves. The length of the notch however shall be 8mm long.

- One notch - 1000 kPa operating pressure
- Two notches - 1600 kPa operating pressure
- Three notches - 2500 kPa operating pressure
- Four notches - 4000 kPa operating pressure

3.14.3 Identification Plate Markings

Identification plate markings shall be hard-stamped, printed or engraved on a stainless steel nameplate fitted to the valve with stainless steel screws. (Refer to drawing BF 1817 in Annexure VS1) If necessary a boss/raised face shall be cast as part of the body to fit the nameplates.

- a) Manufacturer's name or trade mark
- b) Nominal size (DN) in millimetres
- c) Contract number
- d) Nominal pressure (PN) in kPa
- e) Serial number
- f) Item number



- g) Material, disc/gate and body
- h) Date of manufacture
- i) Mass of valve in kg

3.15 POSITION INDICATORS

Position indicating plates shall be embossed to clearly show the fully open and closed positions as well as the $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ intermediate positions (Refer to drawing BF 1816 in Annexure VS1).

All pulleys, brackets, pins, cables, counterweights, sleeves, indicator gears and fasteners shall be of stainless steel 304 or better.

The indicator system shall be accurately installed and calibrated to give true linear indication of the valve opening. Calibration of the indicator scale shall be done in-situ and directly recorded against the actual valve operation.

Electronic position indicators will be considered. Full details must however be supplied with the offer. Special valve position indicators, calibrated in the specified increments of the valve opening, shall be designed, supplied and installed as required in the Project Specification.

3.16 PIPES AND SPECIALS

3.16.1 General

Pipes and specials shall be manufactured in accordance with SABS 719 and all referred specifications. Either longitudinal butt welding or spiral welding is acceptable.

The surface finishes after fabrication shall be free of score marks, pits, weld spatter and other defects that may affect the performance of the steel in service.

Fabrication of corrosive resistant steel i.e. stainless steel and 3CR12 pipes must take place in a shop separated from carbon steel components. All equipment used in the forming and manipulation of corrosive resistant steel pipes and specials during manufacture must be clean and free of materials that may introduce defects or contaminate the metal with carbon steel.

3.16.2 Welding

Welding shall be in accordance with BSS 2633 and BSS 5135 for mild steel and BSS 4677 for corrosive resistant steel.

Welding of flanges shall be in accordance with BSS 806 type 6.

Weld strength shall not be less than 90 % of that of the plate calculated on the original measured thickness of the plate before welding.

The welding process used should limit heat input to a minimum. This can include the following:

- a) Manual metal arc - (MMA)
- b) Metal inert gas - (MIG)

**3.17 Actuators**

Were required actuators shall be in accordance with Standard Specification DWS 2510/02: Auxiliary Drives.

3.18 Inspection and quality Control

Refer to Standard Specification DWS 2010: Quality Control for the general requirements for quality control.

Specific requirements for quality control and testing of valves will be covered by the following paragraphs

3.19 PRESSURE TEST REQUIREMENTS

Valves shall be pressure tested by the manufacturer to prove that all the fully assembled valves are capable of functioning satisfactorily under the specified operating conditions.

3.19.1 Pressure Testing

Test flanges shall be used, tapped holes in valve bodies are unacceptable. Tie-bolts or other forms of restraint applied across the blank flanges for the testing of flanged valves shall not be permitted.

Note :

- a) No valve undergoing pressure testing shall be subject to shock loading.
- b) Valves and connections shall be purged of air prior to pressure testing.

3.19.2 Test Fluid

The test fluid for all pressure tests shall be either water with the addition of a suitable inhibitor, or another liquid whose viscosity at ambient temperature is equal to or less than that of water.

3.19.3 Test ProceduresGeneral

Test pressures shall be maintained for not less than a two (2) minute duration or as otherwise specified by the Engineer and the valves shall be watertight in all respects.

Structural and seat test shall be executed on both sides of double seated valves i.e. gate valves.

All valves, completely assembled, shall be pressure tested by the manufacturer in accordance with Table 1.

TABLE 1 : APPLICABILITY OF PRESSURE TESTS

TEST	SERVICE APPLICATION		
	TIGHT SHUT-OFF	LOW LEAKAGE	REGULATING
Structural			
(i) Body	✓	✓	✓
(ii) Disc strength	✓	✓	N/A
Seat/Seal	✓	✓	N/A

**Structural test:****Body:**

Uncoated valve bodies and bonnets shall be subjected to 1,5 x the maximum permissible working pressure at ambient temperature. Testing shall be carried out before valves are painted or otherwise internally coated with materials that are capable of sealing against leakage.

Both ends of the body shall be blanked off so that the valve is subjected to the full pressure stresses in all directions induced by the test pressure. The valve disc shall be in the open or partially open position during the test. There shall be no visually detectable leakage through the shell of the valve during the test period.

Assembled and fully coated valves shall be subjected to an open-end test for material strength and soundness at a pressure of 1,5 x the maximum permissible working pressure at ambient temperature.

Seepage past gland seals at the abovementioned test pressure shall not be cause for rejection, provided that the gland seals are watertight when the internal test pressure is reduced to the maximum permissible working pressure.

Disc/gate strength:

1,5 x maximum permissible working pressure at ambient temperature.

The valve shall be closed in the normal manner, and the test pressure applied to one side of the disc with the other side open to atmosphere. There shall be no visible evidence of structural damage to or deformation of the disc or of leakage through the disc during the test duration.

Seat/Seal test:

Each assembled valve shall be subjected to open-end tests for drop tightness at the permissible working pressures at ambient temperature. Valves shall be drop tight over the complete range of pressures. Valves with symmetrical seatings shall be tested in either direction.

The maximum permissible leakage shall be as given in Table 2.

TABLE 2 : TEST PRESSURE LEAKAGE RATES

VALVE TYPE	LEAKAGE RATE
Tight shut-off	Rate 3 * : No visible leakage for duration of test. Subject to the Engineer's approval Rate 1 \perp
Low leakage	Rate 1 : 0.1 mm ³ /s x DN

* Leakage rates are defined in BS 5146 : Part 2

3.19.4 Test Certificate

When a test certificate is issued it shall contain a statement by the manufacturer confirming that the valves have been tested in accordance with this standard and stating the actual pressures and medium used in the test.



3.19.5 Anti-static

Valves designated as anti-static shall have electrical continuity between shaft, disc and body when tested in accordance with A.2 of BS 5146 : Part 1.

3.19.6 Pipes and specials

Uncoated pipes and specials including unflanged straight sections prior to fabrication of specials shall be subjected to 1,5x the permissible working pressure at ambient temperature.

Flange welds shall be visually inspected.

Items, which cannot be hydrostatically tested, shall be subjected to a 10 % radiographic inspection plus 100 % dye penetrant or paraffin test.

The following procedure must be observed when radiographic test methods are used:

- a) The weld length to be radiographed shall be clearly marked by the inspector using an identification symbol.
- b) This symbol shall clearly appear on the respective radiograph.
- c) The radiographed weld symbol shall not be obliterated by finishing processes until the inspector has accepted the respective weld.
- d) No alternatives to this procedure will be accepted.

3.20 FUNCTIONAL TEST REQUIREMENT

The manufacturer shall do a functional test on each valve. This shall consist of taking the valve through one complete cycle, from fully closed to fully open and back. The manufacturer shall take particular note that the valve position indicator is correctly calibrated.

3.21 EQUIPMENT DRAWINGS

The Contractor shall submit drawings for the following purposes:

- Tendering
- Manufacturing
- Installation
- Records

3.21.1 Tendering

Drawings giving detailed information of the valves, to make a proper assessment of the equipment offered, shall be submitted with the tender. The drawings shall include overall dimensions of the valves, actuator details, materials of construction, etc.

3.21.2 Manufacturing

After receipt of order, but before manufacturing commences, drawings in triplicate shall be submitted for approval in principle by the Engineer. These drawings shall cover the general arrangements and assemblies of the valves including flange details (drilling, PCD, number-off and diameter of holes etc.), all functional dimensions of valves and actuators, clearance between concrete face and flanges, ease of bolt and stud removal, materials, standard parts, etc.

Two weeks after submission by the Contractor, the Engineer will return one of the above mentioned prints either with his certified approval or else with his comments regarding any amendments that may be required. Drawings returned to the Contractor for amendment



purposes shall be re-submitted in its amended form within 2 weeks of the date of receipt of the drawing by the Contractor.

Approval of the above mentioned drawings by the Department shall only signify approval of the general design and layout and shall not make the Department liable for any error by the Contractor.

The Engineer has the right to suspend manufacture until a set of drawings, a draft Operation and Maintenance Manual and Quality Control Plans (for the manufacture and corrosion protection including data sheets of paint and abrasives used) are in his possession and approved in principle.

3.21.3 Installation

Not later than three weeks after the proposed equipment has been given approval in principle, drawings shall be submitted to allow for adequate site preparation before the arrival of the equipment. These drawings shall offer the necessary details for the programming of civil works, including foundation details.

3.21.4 Records

A complete set of "As Built" drawings in accordance with SABS 0111 must be completed and submitted to the Department together with a electronically saved version preferably on Compact Disc. These "As Built" drawings shall contain general arrangements, assemblies, parts lists (including part numbers) and complete component details. Drawings shall be clear, black line on white paper, unfolded and suitable for photographing for microfilming purposes. The size of the drawing shall not compromise the clarity of the print. All legends shall be in English and all dimensions in the metric system in SI units. Acceptable paper size shall be from A1 to A4.

Each drawing shall be supplied with a title block in accordance with the typical title block. (Refer to Annexure VS1 drawing BF 1819) The name of the scheme, structure and contract number shall be highlighted in bold letters.

In addition to the above, the Department will issue key information to Contractors, i.e. Internal Drawing Numbers, Codes, etc., which shall be included on all documentation and drawings.

3.22 OPERATING AND MAINTENANCE MANUALS

Seven copies of Operating and Maintenance Manuals shall be supplied. A Draft copy of the manual shall be submitted for approval simultaneously with the drawings for manufacturing purposes. (Refer to paragraph 3.20.)

3.22.1 General contents

The purpose of these documents is to simultaneously provide a permanent and accurate record of all the equipment provided as well as a usable guide in simple language covering operating, maintenance and fault finding procedures.

3.22.2 Binding

The manuals shall be securely bound in A4 size, hard backed plastic/waterproof 4-ring binders, with clear pockets on the spine and front cover for the insertion of title slips, giving the Contract Number, Scheme, Dam and a description of the equipment supplied.

Drawings larger than A3 size, index and other title pages shall be contained in separate plastic pockets, bound in the appropriate section.



3.22.3 Layout

The sections shall be separated by plastic dividers, clearly and visibly marked to match the index, and shall be set out as follows:

- a) Title page
- b) Index
- c) Specification and Technical Schedules (supplied by the Department)
- d) General description with test certificates and final test certificate relating to any tests carried out.
- e) Operating Instructions: These shall be clear, concise and easy to follow and must include, where applicable, pre-start, safety and shut down procedures.
- f) Routine maintenance and lubricating schedule.
- g) Fault diagnosis and repair procedure.
- h) Detailed schedule of plant components giving materials, corrosion protection, part numbers, etc.
- i) Spare parts list: Suppliers/Agents details must be provided.
- j) Drawings. They shall include; general arrangements, assembly drawings, hydraulic and electrical diagrams, parts and material list in A3 and flow discharge curves. Suppliers/Agents ORIGINAL brochures and instrumental literature shall also be incorporated in the manual.

3.23 HANDLING AND TRANSPORT

The Contractor is responsible for the safe and undamaged delivery of equipment.

After final product inspection and approval, the valve and related fittings shall be securely packed to prevent damage in transit.

In order to protect the corrosion protection (lining), the ends of valves and fittings shall be securely blanked off with sturdy blank flanges which shall be clearly marked:

“DO NOT REMOVE UNTIL FINAL INSTALLATION”

Plastic sheeting will not be acceptable.

Bolts and other small parts shall be sewn up in strong bags and crated. The bags shall be tagged using metallic tags and indicate the following information:

- manufacturer's identification and contract number,
- part numbers,
- description,
- sizes and
- quantities.

Each bag shall have the delivery address listed on a separate metallic tag.

The use of ropes, wire or chains for lifting without suitable padding is strictly forbidden. For transport or storage purposes, barks of timber shall be used to support the components on any surface and separate them from each other.

Precaution shall be taken shall be taken to support and chock the equipment to prevent movement when loading onto vehicles. Components shall be firmly lashed or chained with



padded lashing supported on sawdust bags. The area of padded surfaces shall be adequate to prevent damage to coatings.

The Site Engineer shall be notified of the delivery date and of any requirements regarding off loading and storage at site.

For site delivery, the transportation and supervision during off-loading will be the responsibility of the Contractor. The final inspection and acceptance of equipment supplied will be undertaken on site after off-loading has been completed. Any damage that occurs during the handling, assembly and storage of equipment at the Manufacturer/Contractor's works, including transportation to site, shall be repaired by the Contractor at his own cost, in accordance with the valve specification and to the satisfaction of the Engineer.

3.24 MATERIAL SYMBOLS

Where appropriate the following symbols shall be used for body material designation:

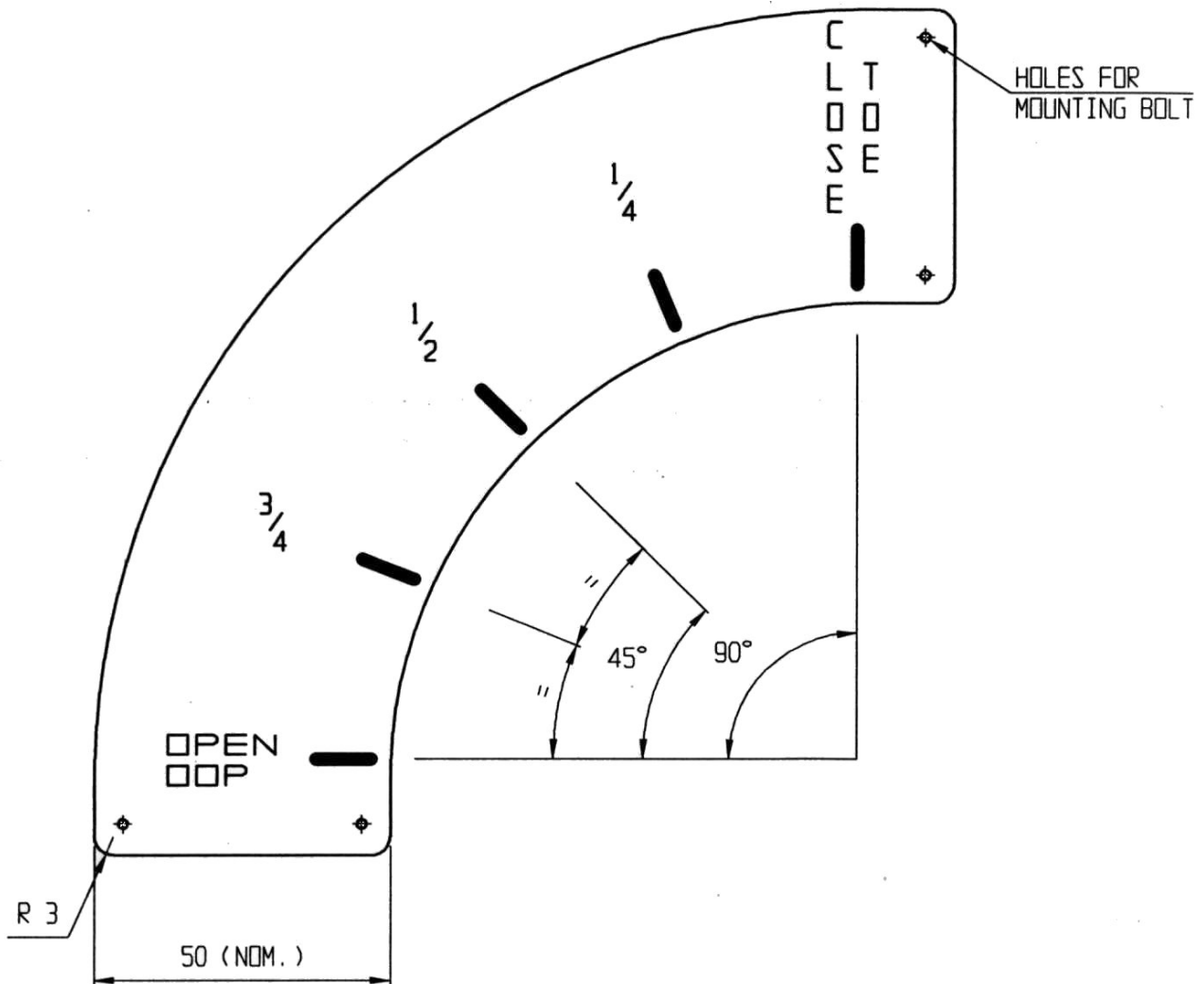
- grey cast iron	CI
- austenitic cast iron	AI
- spheroidal graphite cast iron	SG
- gunmetal	GM
- aluminium bronze	AB
- phosphor bronze	PB
- carbon steel	CS
- stainless steel	SS
- nickel copper	NC
- integral seat	INT
- resilient seat	RES
- deposited seat	DEP



STANDARD SPECIFICATION

DWS 2510 SUPPLY OF VALVES

ANNEXURE VS1 STANDARD DRAWINGS



ALSO OPPOSITE HAND WHERE APPLICABLE

DIRECTORATE: MECHANICAL & ELECTRICAL ENGINEERING			REPUBLIC OF SOUTH AFRICA DEPARTMENT OF WATER AFFAIRS AND FORESTRY DIRECTOR GENERAL: G. BRUEN		
DESIGNED: <i>Ronald 5/8/98</i> DRAWN: A EKSTEEN	DESIGNED: <i>6-8-98</i> DRAWN: A EKSTEEN	KEY CODES: IND DET GEA	TYPE DRAWING		
CHECKED: <i>5/8/98</i> DATE:	CHECKED: <i>6/8/98</i> DATE:	CALCULATIONS FILE: LOCALITY No.	INDICATOR MARKING PLATE DETAIL FOR GEARBOX		
TENDER No. / CONTRACT No.	TENDER No. / CONTRACT No.	PROVINCE: OTHER No. OF 1816	DISTRICT: 1 SHEET OF 1	REG. No.	

COMPANY NAME	W/P	KPo	SERIAL No.	MATL.	DISK:	BODY:
SIZE	mm	CONTRACT No.	BS/SABS	ITEM No.	DATE	MASS
						kg.

COMPANY NAME	SIZE	mm	CONTRACT No.	W/P	KPo	SERIAL No.	BS/SABS	ITEM No.	MATL.	DISK:	BODY:	DATE	MASS	kg.
--------------	------	----	--------------	-----	-----	------------	---------	----------	-------	-------	-------	------	------	-----

LAYOUT AND SIZE OF IDENTIFICATION PLATES SHALL BE TO THE SATISFACTION OF THE DEPARTMENT

DIRECTORATE: MECHANICAL & ELECTRICAL ENGINEERING

DESIGNED:	DATE	KEY CODES:
DRAWN:	DATE	
CHECKED:	DATE	
CALCULATIONS FILE:		
LOCALITY No.		
TENDER No./		
CONTRACT No.		

Handwritten signatures and dates:
 4/1/99
 4/1/99
 5/1/99

REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF WATER AFFAIRS AND FORESTRY

TYPE DRAWING	
IDENTIFICATION PLATES	
PROVINCE:	DISTRICT:
OTHER No. EF 1817	SHEET OF 1 REG.No.

SCHEME	
PROVINCE:	DISTRICT:
KEY CODES:	
CALCULATIONS FILE:	TENDER No.
LOCALITY No.	CONTRACT No.
SHEET OF	DEPARTMENT OF WATER AFFAIRS AND FORESTRY DRAWING REG. No.

DIRECTORATE: MECHANICAL & ELECTRICAL ENGINEERING			REPUBLIC OF SOUTH AFRICA DEPARTMENT OF WATER AFFAIRS AND FORESTRY <small>MINISTER GENERAL: E. BRUEN</small>	
<small>DESIGNED BY</small> <i>Breed</i> 6/8/98 <small>DATE</small>	<small>DESIGNED</small> <i>PCU</i> 6-8-98 <small>DATE</small>	<small>KEY CODES:</small> 	TYPE DRAWING	
<small>DRAWN BY</small> <i>g. Stigter</i> 6/8/98 <small>DATE</small>	<small>CHECKED:</small> _____ <small>DATE</small> _____	<small>CALCULATIONS FILE:</small> 	DIAGRAMME FOR DEPARTMENTAL INFORMATION	
<small>LOCALITY No.</small> 	<small>TENDER No. /</small> <small>CONTRACT No.</small>	<small>PROVINCE:</small> _____	<small>DISTRICT:</small> _____	
<small>OTHER No.</small> BF 1819		1 SHEET OF 1	<small>REG. No.</small> _____	



STANDARD SPECIFICATION

DWS 2510 SUPPLY OF VALVES

ANNEXURE VS2 PROJECT SPECIFIC FORMS



VALVE DATA SHEET (PRO-FORMA)

SHEET 1 OF 2

APPLICATION		√	LOCATION IN SYSTEM (AREA / POSITION)	
ISOLATION				
REGULATORY / THROTTLE				
NON-RETURN				
LEVEL CONTROL				
ANTI-SURGE				
PRESSURE RELEASE				
PROPERTIES OF WATER TO BE HANDLED				
TEMPERATURE RANGE °C		pH RANGE °C		CONDUCTIVITY RANGE °C
..... TO TO TO
RATING PARAMETERS OF PREFERRED TYPE OF VALVE				
NOMINAL BORE (mm)	WORKING PRESSURE		FLOW MEDIUMS SUITABLE FOR	
	NORMAL kPa	MAXIMUM kPa		
.....	
HYDRAULIC PERFORMANCE PARAMETER REQUIREMENTS				
VALVE PARAMETERS	FLOW RANGE			SUPPORTING INFORMATION REQUIRED √ OR X
	MIN.	NORMAL	MAX.	
FLOW VELOCITY m/s				FLOW AT VALVE OPENING
FLOW RATE m ³ /s				VALVE OPENING AT TIME
HEAD LOSS IN m H ₂ O AT INDICATED FLOW RATE				HEAD LOSS AT FLOW RATE
CAVITATION DAMAGE FREE STATIC PRESSURE IN m, H ₂ O AT DOWN- STREAM END OF VALVE FOR WATER AT 20°C AND G = 9,8065 m/s				CAVITATION ZONE AT INLET AND OUTLET PRESSURE (INDICATE GRAPHICALLY) CAVITATION CALCULATION FORMULA
ACTUATOR REQUIREMENTS				
A : CYCLE AND SPEED REQUIREMENTS				
No. OF CYCLES PER OPERATION			REQUIRED CYCLE DURATION IN SECONDS a) OPEN b) CLOSE	



VALVE DATA SHEET (PRO-FORMA)

SHEET 2 OF 2

B : TYPE OF ACTUATOR REQUIRED ✓ OR X	
HYDRAULIC CYLINDER OPERATED BY :	
a) ELECTRIC DRIVEN HYDRAULIC PACK b) HAND PUMP c) DROPWEIGHT	
ELECTRIC MOTOR DRIVEN GEARBOX PLUS HANDWHEEL PLUS DROPWEIGHT WITH :	
a) UNIFORM CLOSURE OVER FULL CLOSING CYCLE b) RETARDED CLOSURE - LAST% OF CLOSING CYCLE	
HAND OPERATED GEARBOX ONLY WITH :	
a) UNIFORM CLOSURE OVER FULL CLOSING CYCLE b) RETARDED CLOSURE - LAST% OF CLOSING CYCLE	
VALVE DRIVE STEM DRIVEN BY WATER PRESSURE ACTUATED DIAPHRAGM WITH :	
a) PIPELINE PRESSURE PILOT CONTROL b) PIPELINE DIFFERENTIAL FLOW PRESSURE PILOT CONTROL c) RESERVOIR BOTTOM PRESSURE, PILOT CONTROL d) FLOAT DETECTED RESERVOIR LEVEL, PILOT CONTROL	
PRESSURE OPERATED MEMBRANE ACTING AS VALVE SEALING ELEMENT WITH :	
a) PIPELINE PRESSURE PILOT CONTROL b) PIPELINE DIFFERENTIAL FLOW PRESSURE PILOT CONTROL c) RESERVOIR BOTTOM PRESSURE, PILOT CONTROL d) FLOAT DETECTED RESERVOIR LEVEL, PILOT CONTROL	
FLOAT OPERATED ACTUATOR ARM ON SUBMERGED DISC WITH :	
a) FLOAT IN RESERVOIR b) FLOAT IN SEPARATE FLOAT CHAMBER	
ELECTRIC MOTOR DRIVEN LINKAGE SYSTEM PLUS HANDWHEEL	
HANDWHEEL DRIVEN LINKAGE SYSTEM	
ELECTRIC MOTOR DRIVEN POWER SCREW PLUS HANDWHEEL WITH :	
a) NON-RISING SPINDLE b) RISING SPINDLE	
HANDWHEEL MOTOR DRIVEN POWER SCREW PLUS HANDWHEEL WITH :	
a) NON-RISING SPINDLE b) RISING SPINDLE	
QUANTITY REQUIRED	TOTAL ESTIMATED COST
COMMENTS :	
.....	
.....	
.....	

**TECHNICAL SCHEDULE FOR VALVES**

(Typical for butterfly valves)

Brand and model	_____
Manufacturer's name	_____
Country of manufacture	_____
Name of firm responsible for license	_____
Mass of valve	_____ kg
Designed working pressure	_____ kPa
Test pressure	_____ kPa
Length over flanges	_____ mm
Head loss through valve at rated flow	_____ m w.g.
Gear ratio and number of turns to open valve manually	_____
Time to open valve	_____ secs
Effort to open valve at hand wheel rim	_____ N
Are horizontal spindle offered?	_____
Materials of construction	
Valve body	_____
Valve disc	_____
Valve shaft	_____
Valve body seat	_____
Resilient seal	_____
Seal retaining ring	_____
Journal bearings	_____
Disc/shaft pin	_____
Shaft bearing seal	_____ s
Gearing	_____
Protective coating	_____
Name of sub contractor(s)	_____
Corrosion protection system used	_____
Brand of corrosion protection coating	_____
Deviation of specification if any	_____

**TECHNICAL SCHEDULE FOR CORROSION PROTECTION**

Applicator proposed	Name:		
	Contact person:		
	Tel.:		
	Address:		
Value corrosion protection (the lot)	R		
List of products offered:	Coat/Stage	Product	Code
		Append pamphlets	
	Primer System (if needed)		
Vinyl Enamel	Top coat		
Pickling paste	Surface prep.		
Passivating paste	Surface prep.		
Blasting Media: For stainless steel	Surface prep.		
: For steel	Surface prep.		
Remarks/Deviations			
Name of Tenderer:			
	Signature:		
	Date:		



SPARE PARTS PRICE LIST

The Tenderer shall propose and submit a price list for all programmed maintenance, and strategic/breakdown spares for the valve(s) together with actuator(s). These spares shall be manufactured concurrently with the contract. Such spares shall be supplied to site as may be ordered and at the prices quoted in this schedule. The Total Price for spares is to be excluded from the Total Tender Price but the necessary spares will be ordered with the main items of the tender.

Item	Number Off	Type or Serial no.	Description	Delivered to site price (Including VAT) RAND
------	---------------	-----------------------	-------------	--

*total price R_____

Name of Tenderer
(block letters) _____

Signature of tenderer _____

Tel _____ Fax _____

Date _____

* not to be included in Total Tender Price